

Pathogenesis of *Cryptosporidium*:

It was learned in 1976 that *Cryptosporidium* was able to cause illness in people. Since then much attention has been paid to this organism. Especially in drinking water. *Cryptosporidium* is a protozoan that can live within the intestinal flora of humans and animals. The protective stage of this organism is the part of the life cycle referred to as an oocyst. This has an outer shell that is protective from external hazards including chlorination. Once this oocyst is ingested the organisms emerges and infects the lining of the intestine. The number of organism needed to cause infection is not known but seems to be a very low, possibly as low as 132. This organism cause a serious disease referred to as cryptosporidiosis. The symptoms of which are severe diarrhea, nausea, vomiting and fever. The diarrhea is watery and causes dehydration of the body if not treated.

***Cryptosporidium* is excreted in the feces of infected persons for up to 60 days. These stools can become infective to other persons. Normally healthy persons may have the disease for two weeks or less but some people that are immunologically compromised may have a more severe and longer lasting disease.**

The organism is present in surface waters throughout the US. It may be found in wells that are under the influence of surface water. The reservoir (vector) of this organism is in many animals but are known to be prominent in cattle. Cattle have a habit of entering water when drinking or when wanting to cool down and have no qualms about defecating in the water. Humans are another reservoir for this disease but not as predominant as animals.

Drinking water can be monitored for this organism with a very complex testing procedure. The State of Kansas Laboratory does not monitor for this organism. Checking the drinking water for turbidity is, at present, the best means that we have to guard against the presence of *Cryptosporidium* in drinking water⁶. Because of its resistance to chlorine the best way to remove this organism from drinking water is by filtration.

Pathogenesis of *Giardia*:

***Giardia lamblia* is a protozoan parasite that infects numerous mammals. Protozoa are unicellular animals that differ from bacteria in that they possess membrane bound genetic material and other assorted cellular organelles. The parasitic group including *G. lamblia* is detrimental to the host. It is an enteric parasite that can be found in the intestinal tract of those animals that it infects. Dogs, cats, beaver, muskrat and deer are important since their fecal matter can come into contact with humans through the oral route. Inside the host, *G. lamblia* is an obligate parasite, which means that it cannot live outside of the host. It forms a cyst or resting body that can survive in the environment including water. When excreted in that form it can survive for long periods of time especially in cool water. Ingestion of the water will revive the cyst which becomes a trophozoite and in this form infects the host. This organism is highly infective. It only takes one cyst to infect a person.**

Giardiasis produces gastrointestinal distress, including severe diarrhea, flatulence, cramps, vomiting, and bloody, foul-smelling stool. The parasite can produce a disease that may have no symptoms called a carrier state or it can produce an illness requiring hospitalization. The time from infection to symptoms may be as long as 75 days. This is why persons traveling outside of the state and drinking “clear mountain water” , when returning home, think that the disease is caused by their home drinking water. The diagnosis is based on finding trophozoites or cysts in fecal matter¹.

The mode of transmission is person to person often times referred to as the “fecal - oral route.” Many of the infections occur in day care centers as well as picnics or other gatherings, especially if the sanitation is poor. In Kansas the predominant reservoir for *Giardia* is children less than 5 years of age the second is the 25 to 35 age group, possibly due to recreational activities in and around contaminated water. Some persons that have private wells “under the influence of surface water” which are often times flooded by swollen creeks, streams or septic system that may have contaminated wells. There are often requests for testing of water for *Giardia* by persons on a Public Water system.

It must be remembered, if one family on a water system is infected then

there will probably more. The large outbreaks of *Giardia* are usually attributed to contaminated water but the smaller number of outbreaks are due to human to human transmission. The cost of testing the water for *Giardia* is more costly than testing humans and the epidemiology of the disease may be more easily tracked than testing treated drinking water. This is another disease that must be reported by the health community so that preventive measures may be taken¹. Like *Cryptosporidium* filtration is best way to remove this organism from drinking water.

Selected Bibliography

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